Center Innovation Fund: JSC CIF

Integrated Power, Avionics, and Software (IPAS) Flexible Systems Integration

Completed Technology Project (2011 - 2012)

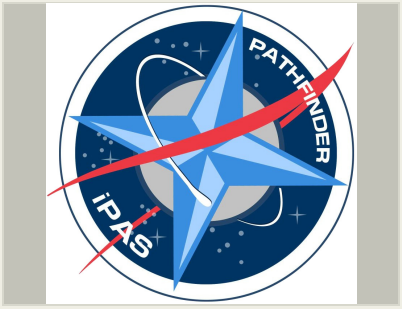
Project Introduction

The Integrated Power, Avionics, and Software (IPAS) facility is a flexible, multi-mission hardware and software design environment. This project will develop a flexible system integration capability, focusing on common tools and processes that have been vetted by engineers and operators, and that can be applied to a variety of missions and analyses. This project will yield a mature IPAS system able to deploy the capabilities to various new projects across the agency, such as MMSEV using the Core Flight Software.

iPAS will develop several important technologies required to support system design and integration as well as space technology maturation. These services include: A Test Orchestration scripting language called mREST that allows test conductors to monitor and control equipment from any web-enabled device. A flexible data network architecture that allows technology teams to test in isolation, but enables cross-system integration when needed. This capability is tied to test orchestration and simulation, allowing mission parameters to support network management (for instance, attaching avionics systems together at docking). Development of SysML models of components, and sponsoring the development of MagicDraw plug-ins. Products produced from the models include interface control specifications, telemetry dictionaries, and test specifications using Automated Test Markup Language (ATML). A multi-center data network capable of supporting both integrated data exchange as well as test monitoring for remote engineers and labs.

Anticipated Benefits

iPAS will enable engineers with innovative ideas to quickly design, develop, and test their technologies within a flight-like space system environment. By leveraging off the iPas-provided services and tools, and by interacting with other space hardware simulators and emulators, new ideas can be fleshed out quickly and performance metrics collected.



Project Image Integrated Power, Avionics, and Software (IPAS) Flexible Systems Integration

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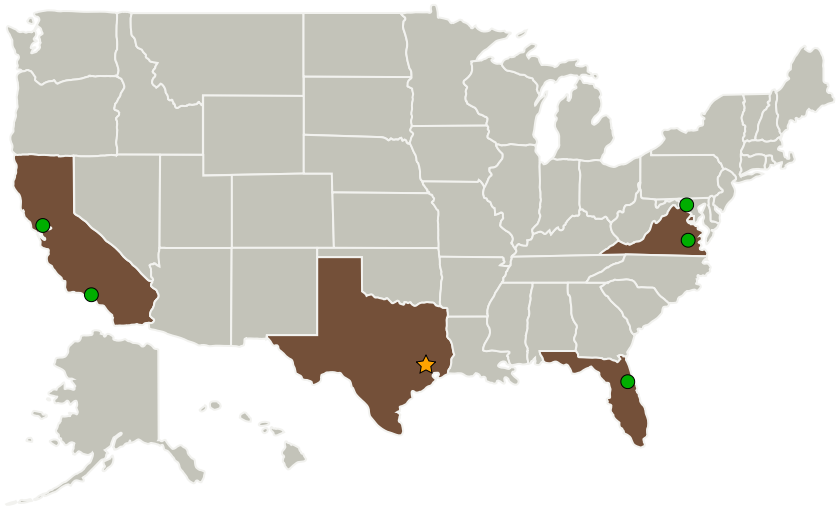
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
●Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California
●Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland
●Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California
●Kennedy Space Center(KSC)	Supporting Organization	NASA Center	Kennedy Space Center, Florida
●Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Center Innovation Fund: JSC CIF

Project Management

Program Director:

Michael R Lapointe

Program Manager:

Carlos H Westhelle

Project Manager:

William L Othon

Principal Investigator:

William L Othon

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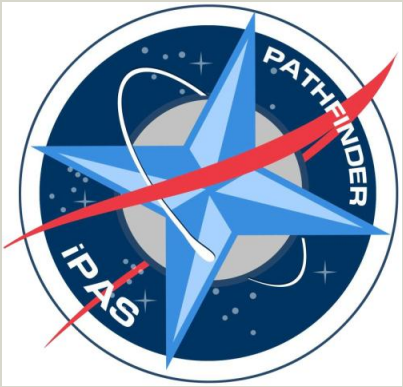
Primary U.S. Work Locations	
California	District of Columbia
Florida	Texas
Virginia	

Images



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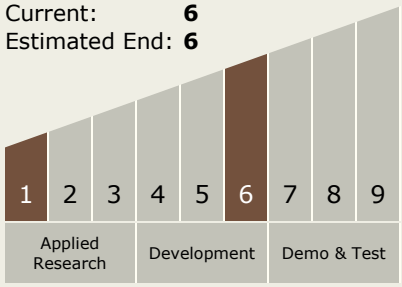
Project Image Integrated Power, Avionics, and Software (IPAS) Flexible Systems Integration
(https://techport.nasa.gov/image/2324)

Technology Maturity (TRL)

Start: **1**
Current: **6**
Estimated End: **6**



Technology Areas

Primary:

- TX17 Guidance, Navigation, and Control (GN&C)
  - TX17.3 Control Technologies
    - TX17.3.4 Control Force/Torque Actuators